

Agency: Commerce, Community and Economic Development**Grants to Named Recipients (AS 37.05.316)****Grant Recipient: Southeast Alaska Power Agency****Federal Tax ID: 92-0174669****Project Title:****Project Type: Planning and Research**

Southeast Alaska Power Agency - Hydroelectric Storage, Generation, Transmission, & Business Analysis

State Funding Requested: \$3,000,000**House District: Southeast Region (1-5)**

Future Funding May Be Requested

Brief Project Description:

Funding will cover the planning and pre-construction work for the next generation of hydroelectric projects in Southeast Alaska.

Funding Plan:

Total Project Cost:	\$5,000,000
Funding Already Secured:	(\$0)
FY2013 State Funding Request:	<u>(\$3,000,000)</u>
Project Deficit:	\$2,000,000

Detailed Project Description and Justification:

SEAPA supplies wholesale power to Ketchikan, Wrangell and Petersburg over its interconnected transmission system. Due to the recent increase in winter heating loads, diesel generation has been required due to insufficient hydro storage capacity to meet these winter loads. The interconnected hydro projects (Swan Lake and Tyee Lake, in addition to smaller projects owned by Ketchikan and Petersburg) typically run short of water in the late winter and spring, and spill in the late summer and fall. Simply put, the existing hydro resource profile does not match the current load profile. In addition, two transmission segments are proposed and were not evaluated in the Southeast Alaska Integrated Resource Plan (SEIRP). These are the Kake - Petersburg (KPI) and Metlakatla - Ketchikan (MKI) segments. Some State funds have previously been appropriated for both of these projects, however neither is construction ready.

SEAPA's Swan Lake Reservoir

Full pool elevation - 330 ft. | Minimum operating level for reserves - 280 ft.

Winter heating loads exhaust water storage, followed by wet season spill events, indicates a lack of storage.

Metlakatla has been the project proponent for the MKI. It also proposes to build new hydro projects on Annette Island for the purpose of meeting its own load and selling surplus into the SEAPA system, including deliveries to Kake over the planned KPI. Kake is presently a 100% diesel generation community. The KPI is currently without a project owner and SEAPA is working with the AEA and IPEC in the development of an MOU for the purpose of moving this project forward.

In addition to the proposed Metlakatla hydro projects, there are numerous potential hydro projects within the

SEAPA-interconnected region, several of which are being proposed by third-parties. In addition to these, SEAPA has completed preliminary engineering and an analysis to raise the dam elevation at Swan Lake for the purpose of adding storage, and is also evaluating other storage options including the installation of a dam at Tyee Lake. It should be obvious that all of these projects cannot be immediately added to the system. These projects are all expensive and the system-wide goal should be to avoid stranded assets and provide the lowest cost to the ratepayer.

The SEIRP was a very high-level study that lacked both the time and adequate funding to complete the hydro engineering and analysis necessary to select hydro projects for inclusion into the SEAPA system. In addition, the MKI and KPI were treated as 'committed projects' and were not evaluated in the study.

The SEIRP report findings and recommendations include the following:

The Southeast region as a whole is currently short of hydro storage capacity. As a result, potential hydroelectric projects with storage capabilities are more valuable, particularly from a system integration perspective (i.e., matching of generation capability with electric demands in connected load centers) than potential run-of-the-river hydro projects.

To get all projects to a comparable level of data quality requires a significant amount of additional study. This effort is outside of the scope of the SEIRP study; consequently, it is impossible at this time to make a definitive selection of which specific resources (e.g., hydro, and/or other renewable technologies of DSM/EE) should be developed within each sub-region to meet future electric requirements.

Consistent with the need to improve the quality and inclusiveness of available information on potential hydro projects, the State Legislature should appropriate funds to assist hydro project proposers' complete high-level reconnaissance studies. These relatively low-cost reconnaissance studies would provide the necessary information to determine whether a proposed hydro project should move forward to the preparation of a FERC license application.

For those proposed hydro projects meeting the needs identified as the next increment of hydro and which have completed reconnaissance studies that show they are sufficiently viable to move to the FERC license process, the State legislature should appropriate funds to assist project proposers in preparation of the FERC license application.

This \$3,000,000 appropriation and intended use of the funds is in alignment with the SEIRP recommendations. The tasks outlined below provide the engineering and analyses necessary to select the appropriate energy resource projects that match the region's expected load profiles, avoid the stranding of assets, and provide the least cost to the region's ratepayers.

Proposed Modification of Swan Lake Dam

Hydroelectric Storage: The recently completed SEIRP reports that the region suffers from a hydro storage capacity shortage. SEAPA supports this finding and, over the past year, identified a relatively inexpensive project that would add a significant amount of storage into the interconnected system. This project would raise the existing dam at Swan Lake by 20 feet thereby increasing the storage capacity at Swan Lake by 33%. The preliminary cost estimate is \$16.6 million dollars. Preliminary engineering, hydrology, and a permitting/license evaluation are complete, all of which were funded by SEAPA. The next step is to file a FERC license amendment and related engineering and design efforts.

Estimated Cost \$578,000

Generation and Transmission: This will include the following tasks and studies:

Hydro Site, including Cost Estimates, Evaluation Engineering: This effort will include construction engineering, hydro plant transmission engineering, basin hydrologic assessment, permit-related surveys, the installation of five stream gauges and five weather stations.

Estimated Cost \$1,705,475

System Stability/Transmission Interconnection Studies: Review of previous work by SEAPA with respect to Kake and Metlakatla interconnections, and potential merchant providers. Stability analysis is the review and use of existing models relative to Kake and Metlakatla loads and resources, respectively.

Estimated Cost \$145,775

System Load Balance Modeling: A model for the system from Kake to Metlakatla that includes reservoir, generation, and transmission constraints, simulation, and optimization capability.

Estimated Cost \$111,750

Project Management, including public meeting and information dissemination.

Estimated Cost \$309,000

These studies and analyses are all required parts of a Systems Integration Analysis. The goal is to develop generation and transmission projects that avoid the stranding of assets, and can integrate into the system to meet loads while providing the lowest cost to the ratepayer.

Business Analysis and Power Sales Agreement Development: In cases where hydro projects are developed through third parties (e.g., Mahoney Lake, Metlakatla projects, Cascade Creek, etc.) a Power Sales Agreement must be developed, and is an essential component of the business plan. For example, the Kake-Petersburg Intertie (KPI) is being planned to move power from existing or new generation sources to Kake. A Power Sales Agreement should be in place between a buyer and seller prior to construction of an Intertie. Interconnection and Wheeling Agreements are also a required component of the overall business plan. As previously stated, not all of the proposed generation projects (including those being proposed by third parties) can be added into the system at the same time without resulting in stranded assets. The development of a Request for Power or Call for Power Proposals may be a method that will allow projects proposed by third parties to be evaluated on an equal basis. All of these efforts will lay out business relationships and define the cost of power and method of integration into the existing system in alignment with existing Power Sales Agreements. These critical components are needed before projects can be financed and constructed.

Estimated Cost \$150,000

Project Timeline:

FY13-14

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

SEAPA

Grant Recipient Contact Information:

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Has this project been through a public review process at the local level and is it a community priority? ☒ Yes ☐ No



Southeast Alaska Power Agency

White Paper

**Hydroelectric
Storage • Generation • Transmission
and
Business Analysis**

Written by:

Dave Carlson
Chief Executive Officer

Southeast Alaska Power Agency
April 2012

SOUTHEAST ALASKA POWER AGENCY

HYDROELECTRIC STORAGE, GENERATION, TRANSMISSION AND BUSINESS ANALYSIS

Appropriation: \$3,000,000

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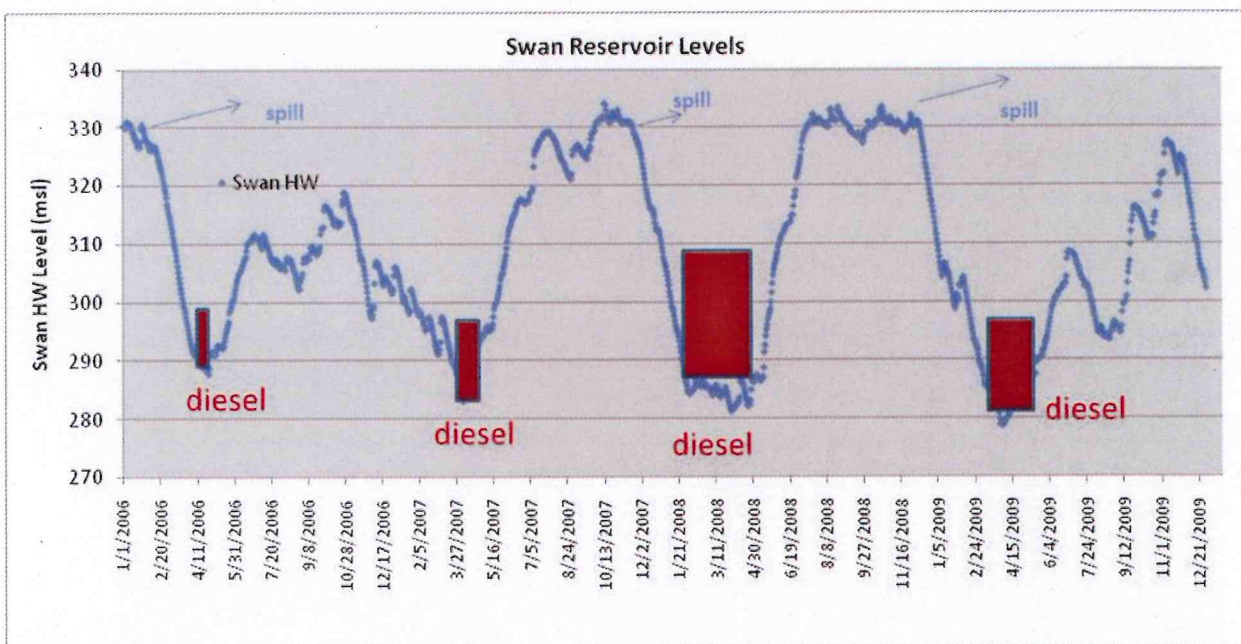


Figure 1

SEAPA's Swan Lake Reservoir

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SOUTHEAST ALASKA POWER AGENCY

In addition to the proposed Metlakatla hydro projects, there are numerous potential hydro projects within the SEAPA-interconnected region, several of which are being proposed by third-parties. In addition to these, SEAPA has completed preliminary engineering and an analysis to raise the dam elevation at Swan Lake for the purpose of adding storage, and is also evaluating other storage options including the installation of a dam at Tyee Lake. It should be obvious that all of these projects cannot be immediately added to the system. These projects are all expensive and the system-wide goal should be to avoid stranded assets and provide the lowest cost to the ratepayer.

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The SEIRP report findings and recommendations include the following:

- *The Southeast region as a whole is currently short of hydro storage capacity. As a result, potential hydroelectric projects with storage capabilities are more valuable, particularly from a system integration perspective (i.e., matching of generation capability with electric demands in connected load centers) than potential run-of-the-river hydro projects.*

To get all projects to a comparable level of data quality requires a significant amount of additional study. This effort is outside of the scope of the SEIRP study; consequently, it is impossible at this time to make a definitive selection of which specific resources (e.g., hydro, and/or other renewable technologies of DSM/EE) should be developed within each sub-region to meet future electric requirements.

- *Consistent with the need to improve the quality and inclusiveness of available information on potential hydro projects, the State Legislature should appropriate funds to assist hydro project proposers' complete high-level reconnaissance studies. These relatively low-cost reconnaissance studies would provide the necessary information to determine whether a proposed hydro project should move forward to the preparation of a FERC license application.*
- *For those proposed hydro projects meeting the needs identified as the next increment of hydro and which have completed reconnaissance studies that show they are sufficiently viable to move to the FERC license process, the State legislature should appropriate funds to assist project proposers in preparation of the FERC license application.*

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SOUTHEAST ALASKA POWER AGENCY



Figure 2
Proposed Modification of Swan Lake Dam

1. Hydroelectric Storage: The recently completed SEIRP reports that the region suffers from a hydro storage capacity shortage. SEAPA supports this finding and, over the past year, identified a relatively inexpensive project that would add a significant amount of storage into the interconnected system. This project would raise the existing dam at Swan Lake by 20 feet thereby increasing the storage capacity at Swan Lake by 33%. The preliminary cost estimate is \$16.6 million dollars. Preliminary engineering, hydrology, and a permitting/license evaluation are complete, all of which were funded by SEAPA. The next step is to file a FERC license amendment and related engineering and design efforts.

- **Estimated Cost \$578,000**

2. Generation and Transmission: This will include the following tasks and studies:

- Hydro Site, including Cost Estimates, Evaluation Engineering: This effort will include construction engineering, hydro plant transmission engineering, basin hydrologic assessment, permit-related surveys, the installation of five stream gauges and five weather stations.

- **Estimated Cost \$1,951,650**

- System Stability/Transmission Interconnection Studies: Review of previous work by SEAPA with respect to Kake and Metlakatla interconnections, and potential merchant providers. Stability analysis is the review and use of existing models relative to Kake and Metlakatla loads and resources, respectively.

- **Estimated Cost \$145,775**

SOUTHEAST ALASKA POWER AGENCY

- System Load Balance Modeling: A model for the system from Kake to Metlakatla that includes reservoir, generation, and transmission constraints, simulation and optimization capability.

- **Estimated Cost \$111,750**

- Project Management, including public meeting and information dissemination.

- **Estimated Cost \$309,000**

These studies and analyses are all required parts of a Systems Integration Analysis. The goal is to develop generation and transmission projects that avoid the stranding of assets, and can integrate into the system to meet loads while providing the lowest cost to the ratepayer.

3. Business Analysis and Power Sales Agreement Development: In the case where hydro project development is through third parties (e.g., Mahoney Lake, Metlakatla projects, Cascade Creek, etc.) the development of a Power Sales Agreement, and Interconnection and Wheeling agreements will be required. This may initially be in the form of an MOU. These documents lay out the business relationship and will define the cost of power and method of integration into the existing system in alignment with existing Power Sales Agreements. It is not anticipated that significant funds are required for this effort; however, it is included as an overall task as the development of the business case and Power Sales Agreement are the critical components needed before projects can be financed and constructed.